REMARKS

35 U.S.C. § 102 Rejections

The Examiner has rejected claims 1-17 under 35 U.S.C. § 102(e) as being anticipated by Obayashi.

Obayashi does not disclose a short-time storage and a long-time storage that are connected in parallel when the voltage of the short-time storage equals or drops below the voltage of the long-time storage.

Obayashi discloses a high-voltage battery 3 and a low-voltage battery 4. The high-voltage battery has a rating voltage at least three times higher than that of the low-voltage battery (col. 18, lines 16-23). A DC-DC power converter may interchange the electric power between the batteries (col. 18, lines 32-25). Obayashi does not disclose that the voltage of the high voltage battery may increase so much that equals or drops below the voltage of the low voltage battery. Apparently, the high-voltage and low-voltage batteries are maintained at nearly fixed voltages, different by at least a factor of 3. A transmission of electric power from the low-voltage battery to the high-voltage battery is controlled by a battery controller which is aware of the state of charge of the batteries (col. 18, lines 51-64). Thus, the energy is transmitted over the DC-DC controller from the low-voltage level to the high-voltage level, but not based on the voltage of the short-time storage becoming equal or dropping below the voltage of the long-time storage based on the state-of-charge information. Therefore, Obayashi does not disclose a short-time storage and a long-

time storage that are connected in parallel when the voltage of the short-time storage equals or drops below the voltage of the long-time storage.

Claims 1 and 15 include a short-time storage and a long-time storage that are connected in parallel when the voltage of the short-time storage equals or drops below the voltage of the long-time storage. Specifically, claims 1 and 15 include the limitation "when the boost operation requires so much energy that the voltage of the short-time storage equals or drops below the voltage of the long-time storage, the electric valve connects the short-time storage in parallel."

Therefore, claims 1 and 15 are not anticipated by Obayashi because claims 1 and 15 include a limitation that is not disclosed in Obayashi.

Claims 2-14 are dependent on claims 1 and should be allowable for the same reasons as claim 1 stated above.

Obayashi also does not disclose a down converter in addition to an electric valve between the high-voltage battery and the low-voltage battery.

In this regard, in Obayashi, if the DC-DC converter is considered as an "electric valve," then there is no additional down converter. If, on the other hand, the DC-DC converter is considered as the "down converter," then there is no electric valve in Obayashi. Specifically, Obayashi does not disclose a down converter in addition to an electric valve between the high voltage battery and the low voltage battery.

Applicant, accordingly, respectfully requests withdrawal of the rejections of claims 1-17 under 35 U.S.C. § 102(b) as being anticipated by Obayashi.

35 U.S.C. § 103 Rejections

The Examiner has rejected claims 1-17 under 35 U.S.C. § 103(a) as being unpatentable over Pels in view of Rey.

Pels and Rey do not teach or suggest that the voltage of the short-time storage equals or drops below that of the long-time storage.

Pels teaches a short-time storage and a long-time storage, with the short-time storage being operated at a higher voltage than the long-time storage (42-300 V compared to 24-24 V, col. 6, lines 3-12). The two voltage levels are coupled to each other by a DC-DC converter. The DC-DC converter performs a voltage reduction to supply current from the high-voltage level down to the long-time storage at the low-voltage level, when the electric machine works as a generator (col. 6, lines 16-23). However, Pels does not disclose that the DC-DC converter performs a voltage enhancement when the electric machine works as a motor during a boost operation. Rather, since the short-time storage is a "high capacity energy storage device" (col. 6, line 2), the electric machine, when operated as a motor, is apparently only supplied from this storage device, without any supply to be made from the short-time storage at the lower voltage level. The two batteries are operated at different voltages (42-300 V and 12-24 V), and are only coupled by a DC-DC converter. This

implies that the voltage of the short-time battery does not decrease so much that it equals or drops below the voltage of the low-voltage battery. Rather, the high-voltage and the low-voltage batteries are maintained at their different voltage levels. Therefore, Pels does not disclose that the voltage of the short-time battery equals or drops below that of the long-time battery.

Rey teaches a fuel cell and a battery. The voltage of the fuel cell is normally higher than that of the batter (col. 2, lines 32-34). The battery is used to back-up the fuel cell, because the fuel cell's voltage decreases when it is heavily loaded (col. 2, lines 27-38). This is typical behavior for a long-time storage as it can store a large amount of energy but the unloading rate is small. Consequently, the fuel cell disclosed by Rey may be considered to be a long-time storage which supplies an electric machine during long periods without a heavy load, and the battery can be considered a short-time storage which assists the fuel cell during short transient conditions, when the system is more heavily loaded. Consequently, Rey does not disclose a system in which the charging voltage of the long-time storage is lower than that of the short-time storage. Rather, in Rey, the charging voltage of the long-time storage is higher than that of the short-time storage. Specifically, Pels and Rey do not teach or suggest that the voltage of the short-time battery equals or drops below that of the long-time battery.

Claims 1 and 15 include a short-time storage and a long-time storage that are connected in parallel when the voltage of the short-time storage equals or drops below that of the long time storage. Specifically, claim 1 and claim 15 include the

limitation "when the boost operation requires so much energy that the voltage of the short-time storage equals or drops below the voltage of the long-time storage, the electric valve connects the short-time storage in parallel." Claim 16 and claim 17 include the limitation "whereby the electric valve connects the short-time storage and the long-time storage in parallel when the boost operation requires so much energy that the voltage of the short-time storage equals or drops below the voltage of the long-time storage." Therefore, claims 1, 15, 16, and 17 are patentable over Pels in view of Rey, because claims 1, 15, 16, and 17 include limitations that are not taught or suggested by Pels and Rey.

Claims 2-14 are dependent on claim 1 and should be allowable for the same reasons as claim 1 stated above.

Furthermore, the teaching of Rey is based on a different principle than that of the independent claim. In Rey, during normal operation, most of the time, only the long-time storage (fuel cell) is used to supply the electric machine, and the short-time storage is normally disconnected and inactive. Only in particular cases, when more power is required, is the short-time storage (battery) used to support the long-time storage. Consequently, if one combined the teaching of Pels (or Obayashi) with that Rey, one would obtain a system with a long-time storage (fuel cell) at a higher voltage level, and a short-time storage (battery) at a lower voltage level, in which the short-time storage would back up the long-time storage.

However, the subject matter of the independent claims of the present application is different. According to the independent claims, the short-time voltage

is operated at the higher voltage level, and the long-time storage at the lower-voltage level backs up the short-time storage. In the different structure according to the independent claims, the short-time storage is normally loaded and unloaded whereas the long-time storage is only used when the energy stored in the short-time storage is insufficient. Since, in many of the boost cycles, the capacity of the short-time storage will be sufficient, the short-time storage is subjected less frequently to load-unload cycles so that a power boost supply battery system is provided with an improved lifetime of the long-time storage. The prior art cited does not render obvious such a structure.

Applicant, accordingly, respectfully requests withdrawal of the rejections of claims 1-17 under 35 U.S.C. § 103(a) as being unpatentable over Pels in view of Rey.

Applicant respectfully submits that the present application is in condition for allowance. If the Examiner believes a telephone conference would expedite or assist in the allowance of the present application, the Examiner is invited to call Mark A. Kupanoff at (408) 720-8300.

Pursuant to 37 C.F.R. 1.136(a)(3), Applicant hereby requests and authorizes the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. 1.16 and 1.17, to Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: April 25, 2005

Mark A. Kupanoff
Reg. No. 55,349

Customer No. 008791
12400 Wilshire Boulevard
Seventh Floor
Los Angeles, CA 90025-1030
(408) 720-8300